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10/653,962	09/04/2003	Atsushi Nakamura	00862.023209.	4026

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EXAMINER	
AYASH, MARWAN	

ART UNIT	PAPER NUMBER
2185	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/653,962	NAKAMURA, ATSUSHI	
	Examiner	Art Unit	
	MARWAN AYASH	2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action has been issued in response to the amendment filed 01/21/09. Claims 1-7, 12 are pending in this application. Applicant's arguments have been carefully considered, but are not persuasive in view of the prior art as applied to a broadest reasonable interpretation of the claims and/or moot in view of new grounds of rejection necessitated by amendment to the claims. The examiner appreciates Applicant's effort to distinguish over the cited prior art by more distinctly claiming the invention, however, upon further search and/or consideration, the examiner believes the claims are not yet in condition for allowance. All claims pending in the instant application remain rejected and clarification and/or elaboration with respect to why the claims are not in condition for allowance will hereafter be provided in order to efficiently further prosecution.

Claim Objections

3. **Claims 1, 2 are objected to** because it appears that "notifying to said first device" should be amended to read "notifying ~~to~~ said first device". Appropriate correction is required.

4. **Claim 5 is objected to** because it appears that "writing data on the first data buffer" should be amended to read "writing data ~~on~~ to the first data buffer". Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. **Claims 1-7, 12 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Leong et al. (US Patent # 2003/0182503) in view of Asano et al. (US Patent # 6,820,187).

With respect to **independent claims 1, 2, 6, 12** Leong discloses: An information processing system/method/apparatus including

first and second devices which connect to each other via a communication control bus [*client 175, storage system 105, disk array 115 or any combination thereof including elements 145, 150, 155 (Leong – Fig. 1) – all elements are interconnected via bus/intercommunication means*];

wherein said first device comprises first and second data buffers [*storage is comprised of a plurality of buffers, wherein a data buffer is understood to be some unit amount of storage operable to store data therein (Leong Fig. 1, paragraph 0004)*] and transmission unit/means for transmitting to said second device, a command block [*a single (macro-command/request) I/O task is transmitted via transmission means (Leong Fig. 1) from a requestor to one or more targets in the form of a plurality of lower-level asynchronous I/O tasks (micro-commands) (Leong abstract, paragraphs 0014, 0046-0047, 0055)*] which designates processing to be performed with said first and second data buffers [a *(macro-command/request) I/O task will designate some processing to be performed for the plurality of data buffers (storage areas) (Leong – abstract, paragraphs 0014, 0046-0047, 0055 and also Fig. 3, 5, paragraphs 0057-0070). Storage system 105 working in conjunction with any of the managers and/or*

software modules in memory 125 is operable to execute a command/request by interacting with a plurality of storage devices such as those in disk array 115 (Leong – abstract, Fig. 1, paragraph 0020)];

wherein said second device comprises completion notifying means for notifying said first device that a data communication for said first data buffer has been completed [*as (micro) I/O tasks, (dealing with individual data buffers or storage areas) complete, the system issues messages/notifications of incremental progress to ensure efficient forward progress of larger tasks (Leong –abstract, paragraph 0050-0052, 0065-0066, 0069)*];

wherein said first device further comprises update means for updating said first data buffer for which the data communication has been completed, in accordance with the notification by said completion notifying means [*Leong's invention (including first and second devices) comprises update means to update storage areas for which there are no outstanding (completion notification not yet received) subordinate I/O tasks, and for not updating (via conditional task suspension) storage areas for which outstanding (completion notification not received) I/O task(s) exist or is/are in the process of completing (Leong – Fig. 4, 5) – for example a write command executed by a child I/O task*].

wherein said transmission means transmits, to said second device, another command block which designates processing to be performed with said first data buffer updated by said update means even if the communication for said second data buffer has not been completed [*any number of commands are issued to the second device, each command designates processing to be performed with data residing in any number of data buffers; once a first round of processing for the first data buffer is complete, that same data buffer may be used for subsequent processing independent of, or with no regard for whether a second data buffer's processing has been completed; note that the first and second data buffers may be accessed by two I/O tasks which do not have corresponding child I/O tasks and thus will not be suspended in order to wait for any child tasks to complete (Leong Fig. 4-5, paragraph 0094)*].

Leong does not **explicitly** disclose (hardware) devices comprising completion notifying (hardware) means for notifying each other of the completion of (data access) requests, but rather discloses his invention more so in the context of tasks notifying other tasks of the completion of data access requests. It is understood that the tasks are operating via the underlying hardware devices such that the limitation in question is understood to be at least implicitly taught or strongly suggested by the cited disclosure of Leong. Accordingly, it is noted that one of ordinary skill may understand Leong's disclosure to anticipate the instant claims.

Nevertheless, in the same field of endeavor Asano teaches a multiprocessor system wherein hardware devices (processors, and memory controllers) (*Asano Fig. 1, 6-7, 16*) operate in a cooperative multiprocessing environment in which commands/requests may be issued executed asynchronously (*Asano Col 5 lines 45-51*), and without waiting for a response to a previously sent command; wherein hardware means (counters and/or status flags) are provided for notifying other hardware elements of command/request initiated completion of a data communication (*Asano – abstract, Fig. 1, Col 6 lines 12, Col 10 lines 20-30*).

Therefore Leong in view of Asano disclose all limitations of the instant claim(s) including:

wherein said first device further comprises update means for updating, using another command block, the one data buffer for which the data communication has been completed in accordance with the notification by said completion notifying means without updating the other data buffers among the first and second data buffers [*counters/flags are only updated for those data transfer commands that have had notification so completion issued on their behalf (Asano – abstract, Fig. 1, Col 6 lines 12, Col 10 lines 20-30)*].

It would have been obvious to one having ordinary skill in the art at the time of the invention to allow hardware devices to notify each other as opposed to software constructs/mechanisms doing the same because this would be advantageous in terms of implementation flexibility (*Leong - 0035*) and

moreover would have been within the purview of the artisan since it is known in the art that hardware and software are logically equivalent *(evidenced by Tanenbaum ("Structured Computer Organization, 3rd ed. 1990," section 1.4, page 11, hardware and software are logically equivalent)*. Therefore it is understood that the tasks, and their underlying hardware perform the functionality of the claimed completion notifying means since although the instant claim limitation is directed toward hardware means for notifying a (hardware) device of completion of a data communication, the operations to be performed by the (hardware) means correspond to the operations performed by the tasks and/or underlying hardware supporting the tasks (as disclosed by Leong), and one of ordinary skill in the art would realize that a (software) task performing a set of operations would read upon a hardware element performing those same set of operations.

With respect to **dependent claim 3** as applied to claim 2 above Leong discloses the two devices are connected via a communication control bus complying with IEEEI394 [*The examiner is taking official notice that connecting to storage via IEEE 1394 would have been obvious to one having ordinary skill in the art at the time of the invention. Implementing this feature in the invention of Leong would have been obvious to one having ordinary skill in the art because connecting to external storage via IEEE 1394 is old and well known in the art (as evidenced by Palatov US PGPub # 2001/0029583 - page 8 paragraph 0098, page 14 paragraph 0164), and one of ordinary skill would be motivated to connect to external storage via IEEE1394 because an IEEE1394 interface is a known serial high speed interface for storage devices, and also because Leong suggests this limitation by disclosing coupling storage disks to a storage system over an I/O interconnect arrangement, such as a conventional high-performance, Fibre Channel serial link (Leong – paragraph 0037)*].

With respect to **dependent claims 4, 7** as applied to claims 2, 6 above Leong discloses transmitting the command block [*Leong – paragraph 0046*] which contains a plurality of pieces of identification information respectively indicating the first and second data buffers, and commands

respectively for the first and second data buffers [*an exemplary I/O task includes eight parameters, which include identification information respectively indicating the first and second data buffers or storage areas, and commands respectively for the first and second data storage areas (Leong – paragraph 0047 - 0049)*].

With respect to **dependent claim 5** as applied to claim 2 above Leong discloses writing data on the first data buffer or reading data from the first data buffer [*Leong – paragraph 0020*].

Response to Arguments

8. Applicant's arguments filed 01/21/09 have been fully considered but are not persuasive in view of the prior art and/or moot in view of new ground(s) of rejection. All claims pending in the instant application remain rejected. Please note that any rejections/objection not maintained from the previous Office Action have been rectified either by applicant's amendment and/or persuasive argument(s).

Applicant argues that the cited references do not teach the newly worded limitations. The above rejections have been adjusted to correspond to the newly worded limitations.

It is noted that the examiners assertion of implicit teachings is not equivalent to an assertion of inherent teachings.

Regarding applicant's argument that there is no showing of any indication of motivation in the cited documents that would have lead one of ordinary skill in the art to arrive at the combination – the examiner would like to direct applicants attention to the last paragraph of the 103 rejection as containing such motivation.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. When responding to this Office Action, **any new claims and/or limitations should be accompanied by a reference as to where the new claims and/or limitations are supported in the original disclosure**.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marwan Ayash at 571-270-1179. The examiner can normally be reached on Mon-Fri 10am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on (571)272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Marwan Ayash -- Examiner -- Art Unit 2185

03/10/09

/Sanjiv Shah/

Supervisory Patent Examiner, Art Unit 2185